

ACCESSION NR: AT4022204

ENCLOSURE: 01

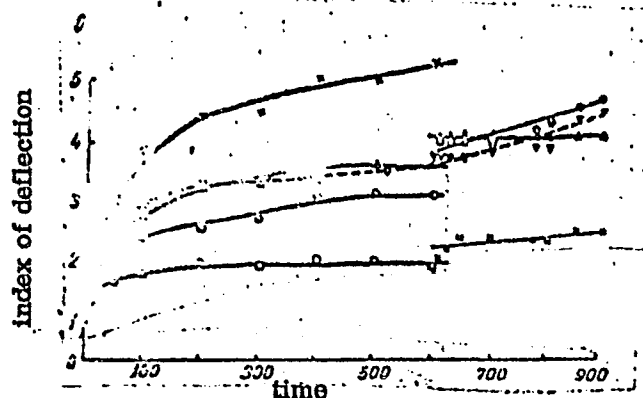


Fig. 1 - Relative heat resistance of Fe-Cr-Ni steel containing Si and C and alloyed successively with W, Mo, Nb, Ti and Al.

° Basic steel, $\sigma = 15 \text{ kg/mm}^2$; ° Basic steel, $\sigma = 20 \text{ kg/mm}^2$; x W alloy, $\sigma = 15 \text{ kg/mm}^2$; Δ W + Mo alloy, $\sigma = 15 \text{ kg/mm}^2$; ▲ W + Mo alloy, $\sigma = 20 \text{ kg/mm}^2$; □ W + Mo + Nb alloy, $\sigma = 15 \text{ kg/mm}^2$; ■ W + Mo + Nb alloy, $\sigma = 20 \text{ kg/mm}^2$; ▽ Complete alloy, $\sigma = 15 \text{ kg/mm}^2$; ▼ Complete alloy, $\sigma = 20 \text{ kg/mm}^2$.

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ACCESSION NR: AT4022205

S/0000/63/000/000/0057/0062

AUTHOR: Vinokur, B. B.; Braun, M. P.

TITLE: Creep of steel containing molybdenum and tungsten

SOURCE: AN UkrRSR. Instytut lykvarnogo vyrobnytstva. Konstruktsionnyye i zharoprochnyye splavy* (Structural and heat-resistant alloys). Kiev, Izd-vo AN UkrSSR, 1963, 57-62

TOPIC TAGS: creep, steel creep, molybdenum steel creep, tungsten steel creep, alloy, perlitic steel, chromium steel

ABSTRACT: Testing methods are divided into: isothermic, dilatometric and relaxation depending on the three factors causing creep (temperature, stress, strain). The last two methods differ from the first, since elongation due to creep is compensated by temperature variation (dilatometric) or stress (relaxation), i.e. by processes eliminating creep. Creep resistance is estimated by three methods: by the stress causing the given strain rate, by the stress causing a total strain for a given time and by stress leading to zero creep (creep limit). The creep rate of different alloys depends to a large extent on the temperature. Nickel alloys of perlitic steel lead to strengthening at low temperatures and to significant loss of strength at high temperatures. The creep limit of 35KhGNV steel at 450-500C

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is relatively high and may be compared with the creep limit of chromium-nickel and chromium-nickel-molybdenum steel. Orig. art. has: 1 figure, 2 tables and 4 formulas.

ASSOCIATION: INSTYTUT LY*VARNOGO VY*ROBNY*TSTVA AN UkrSSR (Institute of, Manufacture, AN UkrSSR)

SUBMITTED: 00

DATE ACQ: 19Mar64

ENCL: 01

SUB CODE: ML

NO REF SOV: 005

OTHER: 000

Card

2/02

ACCESSION NR: AT4022206

S/0000/63/000/000/0063/0065

AUTHOR: Vinokur, B. B.; Braun, M. P.

TITLE: Application of an express creep testing method using the I. A. Oding formula

SOURCE: AN UkrSSR. Insty*tut ly*varnogo vy*robny*tstva. Konstruktsionny*ye i zharoprochny*ye splavy* (Structural and heat-resistant alloys). Kiev, Izd-vo AN UkrSSR, 1963, 63-65

TOPIC TAGS: creep test, express creep test, creep, Oding formula

ABSTRACT: All contemporary theoretical papers on metal creep may be divided into 3 groups: the first considers creep as simple flow of metals at high temperature; the second examines creep from the point of view of the mathematical theory of plasticity; and the third studies creep from the point of view of metallography and metal physics. Due to the excessively long time required for classical creep tests, the authors compared short-term results processed by the Oding formula

$$\epsilon = V\tau + C \frac{P\tau}{1 - P\tau}$$

with long-term experi-

mental data. These creep tests took only 300-500 hours compared to 2500 hours and the results were very close to the theoretical. It is, therefore, possible to use the Oding formula to decrease the time required for creep tests, employing only the minimum testing

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time for finding the creep rate. Orig. art. has: 2 tables and 4 formulas.

ASSOCIATION: Insty*tut ly*varnogo vy*robnytstva AN UkrSSR (Institute of Foundry Technology, AN UkrSSR)

SUBMITTED: 00

DATE ACQ: 19Mar64

ENCL: 00

SUB CODE: ML

NOREF SOV: 002

OTHER: 000

2/2

Card

ACCESSION NR: AT4022207

S/0000/63/000/000/0091/0099

AUTHOR: Braun, M. P.

TITLE: Effect of additional alloys on the strength and viscosity of chromium-manganese-silicon steel

SOURCE: AN UkrRSR. Insty*tut ly*varnogo vy*robny*tstva. Konstruktsionny*ye i zharoprochny*ye splavy* (Structural and heat-resistant alloys). Kiev, Izd-vo AN UkrSSR, 1963, 91-99

TOPIC TAGS: chromium manganese silicon steel, steel strength, steel viscosity steel strength composition dependence, steel viscosity composition dependence, copper containing steel molybenum containing steel, titanium containing steel, nickel containing steel, aluminum containing steel

ABSTRACT: It has repeatedly been noted that an increase in the concentration of dissolved atoms in the lattice of a metal solvent leads to additional chemical bonds and strengthening of the solid solution lattice. A study of the physical properties of the alloys Cr-Mn-Si-Cu, Cr-Mn-Si-Cu-Mo, Cr-Mn-Si-Ni-Mo-Ti, Cr-Mn-Si-Ni-Mo-Cu-Ti, and Cr-Mn-Si-Ti-Al. showed that additional alloys significantly change the properties of Cr-Mn-Si steel. The addition of Ni + Cu with low or intermediate tempering temperatures leads to optimal or

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at least satisfactory properties. It increases the yield point and is much better than addition of either Cu or Ni alone. Good results are obtained on alloying Cr-Mn-Si steel with either Ni + Mo + Ti, Ni+Cu+ Mo + Ti or Ni + W + Ti, leading to a very high yield point. Some data are also given on the atomic structure of the alloying elements, and the attempt is made to relate their effect on the strength and viscosity of steel to the formation of a more complex solid solution. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: Insty*tut ly*varnogo vy*robyn*tstva AN UkrSSR (Institute of Foundry Technology, AN UkrSSR)

SUBMITTED: 00

DATE ACQ: 19Mar64

ENCL: 00

SUB CODE: ML

NO REF SOV: 006

OTHER: 003

Card

2/2

ACCESSION NR: AT4022208

S/0000/63/000/000/0116/0123

AUTHOR: Braun, M.P.

TITLE: Case depth of complex alloy steel

SOURCE: AN UkrRSR. Insty*tut ly*varnogo vy*robny*tstva. Konstruktsionny*ye i zharoprochny*ye splavy* (Structural and heat-resistant alloys). Kiev, Izd-vo AN UkrSSR, 1963, 116-123

TOPIC TAGS: case depth, steel alloy case depth, complex alloy steel, Ni alloy steel, Mo alloy steel, steel

ABSTRACT: By case depth is usually meant the depth of the hardened zone for a given cross-section, consisting of 50% martensite and 50% troostite. The present article deals with methods of evaluating the case depth and the effect of various alloying elements on the hardness of complex alloy Cr-Mg-Si and Cr-Mg steel, which have low case depth. The author points out the deficiencies in the formulas derived by Grossman and Mes'kin. The coefficients proposed by Mes'kin give excessive values when used for finding the case depth of complex alloy steels and cannot be used in industry. The nomograph proposed by Blanter gives values lower than those obtained by the Mes'kin method, but they also cannot be used for complex alloy steels. The best results are obtained

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when the principal mechanical properties are determined at different depths of the given section. The hardness of the hardened structure is determined not only by the carbon content but also by the content and type of alloying elements. Therefore, the graphs given in handbooks cannot be used for complex alloy steels. In many cases, hardening and tempering of structural steel at 400-450C results in higher hardness than that of the so-called semimartensite structure as determined by Blanter. The case depth of Cr-Mg and Cr-Mg-Si steel is increased when Ni + Cu, Mo + Ti, Ni + Mo + Ti or W + Ti are added. The addition of 0.30% Mo to steel containing 0.25% C, 1.30% Cr, 1.30% Mn and 1.30% Si leads to a significant increase in the case depth. The effect of nickel on the case depth is illustrated in Fig. 1 of the Enclosure. Complex alloy steels 30KhGVT, 30KhG2MT, 30 Kh2G2MT have a good case depth and may be used as substitutes for nickel steels 40KhN, 35KhNM and others. Orig. art. has: 6 figures and 2 tables.

ASSOCIATION: Insty*tut ly*varnogo vy*robny*tstva AN UkrSSR (Institute of Foundry Technology, AN UkrSSR)

SUBMITTED: 00

DATE ACQ: 19Mar64

ENCL: 01

SUB CODE: ML

NO REF SOV: 003

OTHER: 000

Card 2/3

ACCESSION NR: AT4022208

ENCLOSURE: 01

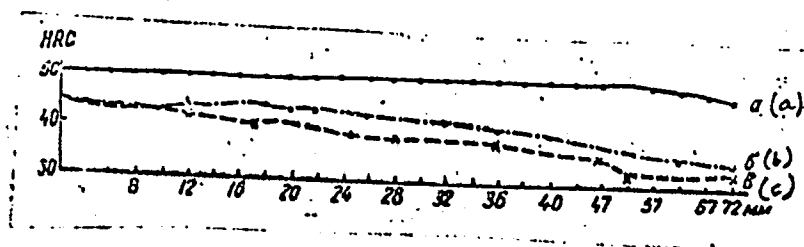


Fig. 1. Case depth curves of steel

a - 25KhGSN, b - 20Kh2N4A, c - 12Kh2N (face hardening method)

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ACCESSION NR: AT4022209

S/0000/63/000/000/0131/0139

AUTHOR: Matyushenko, N. I.; Braun, M. P.

TITLE: Effect of niobium and zirconium on the structure of cast austenitic steel

SOURCE: AN UkrRSR. Insty*tut ly*varnogo vy*robny*tstva. Konstruktsionny*ye i zharoprochny*ye splavy* (Structural and heat-resistant alloys). Kiev, Izd-vo AN UkrSSR, 1963, 131-139

TOPIC TAGS: austenitic steel, cast steel, steel, cast austenitic steel, niobium steel alloy, zirconium steel alloy, steel zirconium inoculation, steel niobium inoculation

ABSTRACT: Inoculation of alloys is currently receiving considerable attention due to the favorable effect of small amounts of alloying elements on physical properties. However, little has been done with cast alloys. The present paper investigates Zr and Nb inoculation of cast austenitic steel obtained by adding ferrotungsten to Cr-N₅ steel in an induction furnace. The chemical composition was 0.07% C, 17.1% Ni, 14% Cr, and 3.88% W. As shown by photomicrographs in the original, the grain size decreases when up to 0.5% Nb is added, but then increases up to the initial dimensions on the further addition of Nb. The hardness changes in the same way as the grain size (up to 0.506% Nb). The rate of origination of crystallization centers can be expressed by (copy equation from p. 136)

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where Q is the energy of activation, σ is the surface tension, T is the temperature in $^{\circ}K$ and K and B are constants. Laboratory studies showed that niobium is a surface active element which increases the adsorption effect. This, in turn, leads to fine grain crystallization. The generally similar results obtained with Zr indicate that Zr is a weaker surface active element. Both Zr and Nb can be used to produce a structure analogous to that seen in wrought steel. Orig. art. has: 2 illustrations and 1 table.

ASSOCIATION: Insty*tut ly*varnogo vy*robny*tstva AN UkrSSR (Institute of Foundry Technology, AN UkrSSR)

SUBMITTED: 00

DATE ACQ: 19Mar64

ENCL: 00

SUB CODE: ML

NO REF SOV: 016

OTHER: 002

Card 2/2

L 25319-65 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/EPR/T/EWP(t)/EWP(b) Pg-4/Pu-4 JD/JH/JG

ACCESSION NR: AR5000604

S/0137/64/000/008/I074/I074

SOURCE: Ref. zh. Metallurgiya. Sv. t., Abs. 8I465

35
B

AUTHOR: Aleksandrov, A. G.; Braun, M. P.

TITLE: Certain characteristics of the structure and properties of non-nickel cast refractory alloys

CITED SOURCE: ¹⁴Sb. Legirovaniye staley. Kiyev, Gostekhnizdat USSR, 1963, 137-142

TOPIC TAGS: nickel economy, metal structure, metal physical property, metal mechanical property, refractory alloy, alloying, cast structure

TRANSLATION: The following systems of alloys have been investigated: iron-chromium (25-30%), iron-chromium²(25-30%)-titanium¹(to 0.8%), iron-chromium (to 30%)-aluminum¹(1-6%), iron-chromium (12-22%)-manganese¹(10-14%)-titanium (0.3-1%) makhot alloys, iron-chromium (20-24%)-manganese (8-13%)-silicon (to 2.1%)-molybdenum (to 0.7%)-titanium (to 0.05%), as well as alloys also containing additions of

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L 25319-65

ACCESSION NR: AR5000604

nitrogen or copper. The melts were made in a VCh furnace in crucibles with an acid lining under a silicate slag. The value of a_k for these alloys in the cast state was, respectively: 0.3-0.5, 0.6-1.0, 0.2-0.4, 0.6-0.7, 0.4-1.0 kgm/cm². The optimum chromium content in the alloys was 8-10% by weight (a_k 1.8-6.6 kgm/cm²). Among the alloys iron-chromium-manganese-titanium-silicon (magnetic), iron-chromium-manganese-aluminum-molybdenum (non-magnetic) and iron-chromium (8-11%)-manganese (10-13%)-silicon (1.6-2.5%)-aluminum (1.8-2.5%) (weakly magnetic), the best combination of properties is possessed by the latter (average increase in weight at 1000° in the course of 100 hours 0.872 g/m²·hr, a_k 1.6-2.3 kgm/cm²). For makhrot they are respectively 0.6518 g/m²·hr, 0.5-0.8 kgm/cm². The alloy with molybdenum at a_k 2.2-5.9 kgm/cm² has poor heat resistance, 2.3372 g/m²·hr. The structure of the alloys is two phase, with large amounts of carbides. 6 literature titles. B. Samarin.

SUB CODE: MM

ENCL: 00

Card 2/2

BRAUN, Mikhail Petrovich; VINOKUR , Bertol'd Bentsionovich;
CHERNOVOL, Arkadiy Vasil'yevich; CHERNYI, Viktor
Gavrilovich; ALEKSANDROV, Anatoliy Grigor'yevich;
KOSTYRKO, Oleg Stepanovich; ALEKSANDROVA, Natal'ya
Pavlovna; LYASHENKO, Lyudmila Aleksandrovna;
MATYUSHENKO, Nelli Ivanovna; FIKSEN, N.V., kand. tekhn.
nauk, otv. red.; POKROVSKAYA, Z.S., red.; DAKHNO, Yu.B.,
tekhn. red.

[Structural and heat-resistant alloys] Konstruktsionnye
i zharoprochnye splavy. Kiev, Izd-vo AN USSR, 1963. 149 p.
(MIRA 17:3)

1. Akademiya nauk URSR, Kiev. Instytut lyvarnoho vyrob-
nytstva.

ACCESSION NR: AT4013953

S/2659/63/010/000/0207/0214

AUTHOR: Braun, M. P.; Tikhonovskaya, L. D.; Matyushenko, N. I.

TITLE: Effect of cerium and boron on the structure of cast austenitic steel

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 10, 1963, 207-214

TOPIC TAGS: steel, steel EI-695, alloy steel, cerium, boron, cast steel, cast steel structure, steel microhardness, steel carbide content, austenitic steel, tempered steel, aged steel, steel mechanical property

ABSTRACT: The authors report the results of studies on the structure and mechanical properties of cast austenitic steel EI-695 after modification with varying amounts of cerium and boron, and after tempering or aging. The alloys were prepared in a 0.5-kg high-frequency induction furnace. After casting, the steel was heated to 1150C for 10-20 hrs. and then quenched in water, followed by aging at 750C for 20 hours; X-ray analysis and tests of microhardness were performed at each stage. It was found that addition of cerium in amounts of only 0.01-0.03% disintegrated the dendritic structure of cast steel and produced a uniform microstructure, while larger amounts (0.1-0.3%) produced a grain structure similar to that of stressed steel. Boron had a similar effect, and the best results

ACCESSION NR: AT4013953

were obtained with a combination of 0.3% Ce and 0.1% B. Studies of strength and plasticity showed that these were decreased by 0.3% B, although a maximal ultimate strength (85% of that of stressed steel) was obtained with 0.08-0.18% B. Addition of Ce (0.1-0.4%) increased the strength to 80%, the relative elongation to 150% and the relative compressibility to 85% of that in stressed steel. Studies of the carbide distribution in both tempered and untempered cast steel showed only a single NbC phase, regardless of modification, but the addition of Ce and especially of B had a marked effect on the crystal lattice of the solid solution and the distribution of the carbide. Cerium displaces the carbide from the grain boundary into the center of the grain, while boron facilitates its deposition along the grain boundaries. As shown in the Enclosure, the microhardness is almost the same in the center of the grain as along the boundary after addition of Ce, while B increases the microhardness in the border zone. Addition of very small amounts of B (0.005-0.05%) leads to very high microhardness in aged cast steel. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute, AN SSSR).

SUBMITTED: 00

DATE ACQ: 27Feb64

ENCL: 01

SUB CODE: MM

NO REF SOV: 025

OTHER: 004

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ACCESSION NR: AT4013953

ENCLOSURE: 01

Variation in microhardness (kg/mm^2) of steel in relation to the addition of modifiers and the type of treatment

Amt. of modifier in %	cast steel		tempered steel		aged steel	
	grain boundary	grain center	grain boundary	grain center	grain boundary	grain center
no addition	330	274	250	219	335	325
0,01 Co	247	229	240	208	360	383
0,03 Co	280	248	192	148	260	276
0,10 Co	290	265	180	220	284	285
0,30 Co	293	280	159	145	304	276
0,50 Co	342	318	265	220	364	325
0,01 B	308	282	246	198	344	380
0,10 B	238	307	282	294	298	306
0,30 B	225	230	225	213	306	258
0,02 Co+0,025 B	336	281	268	224	320	376
0,3 Co+0,1 B	303	258	250	200	331	330
0,5 Co+0,03 B	323	260	283	200	365	335

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L 23363-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) JD

ACCESSION NR: AR5000599

S/0137/64/000/008/I065/I065

SOURCE: Ref. zh. Metallurgiya. Sv. t., Abs. 81413

AUTHOR: Braun, M. P.; Vinokur, B. B.; Kondrashev, A. I.;
Kostyrko, G. S. B

TITLE: The problem of the principles of alloying steel

CITED SOURCE: Sb. Legirovaniye staley. Gostekhizdat USSR, 1963,
253-260

TOPIC TAGS: alloying, steel, steel alloying, steel hardening,
metal ductility, metal brittleness, metal grain structure 18

TRANSLATION: ¹⁸In the works of A. P. Gulyaev (RZhMet, 1961, 12D344)
there is a discussion of the effect of alloying on certain properties
of steel. He proposes to divide steels into 7 categories according
to σ_{H} ; this means that various steels in the same σ_{H} group
could differ substantially in the most important rated characteristic,
 σ_{S} . A. P. Gulyaev incorrectly thinks that alloying is basically
necessary only for the attainment of the required hardenability.

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ACCESSION NR: AR5000599

Much work has been carried out recently which refutes this principle. According to A. P. Gulyaev's data, excessive alloying causes a worsening of dynamic ductility, but with an increase in the addition of nickel in alloying there is an improvement in σ_k . A. P. Gulyaev incorrectly considers molybdenum as the only element which suppresses brittleness in tempering. It is proposed that tungsten be added to steels in small quantities to improve hardenability. High ductility and a low threshold of cold brittleness, in the opinion of A. P. Gulyaev, can be improved only when a fine truly austenitic grain structure is preserved. The grain fineness of the structure has a considerable effect on ductility, but the decisive factor is the alloying. To obtain a fine grain structure, A. P. Gulyaev proposes to introduce 1 kg aluminum and 3-4 kg titanium per ton of steel, but such an amount of aluminum is excessive because it has such a marked bad effect on the fluidity of the metal. The titanium content should be increased slightly, calculating a 50% loss. The same applies to niobium, vanadium, and zirconium. The addition of these elements should be made in amounts from 0.1 to 0.3%. The alloying of steel with rare earth elements has only a modifying effect and does not bring about any marked improvement in hardenability. L. Koblikova

Card 2/2 SUB CODE: MM

ENCL: 00

L 27262-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) IJP(c) MJW/JD

ACCESSION NR: AP4033655

S/0304/64/000/002/0057/0059

AUTHORS: Braun, M. P. (Doctor of technical sciences); Vinokur, B. B. (Engineer)

TITLE: Optimum quenching regime for 30KhGVT steel

SOURCE: Mashinostroyeniye, no. 2, 1964, 57-59

TOPIC TAGS: alloy steel, quenching, chromium steel, manganese, steel micro-
structure¹⁶ 20KhGVT steel, 30KhGVT steel, 40KhGVT steel, 20KhGSVT steel, 30KhGVM
steel, 30Kh2GMT steel, 30Kh2G2MT steel¹⁶ 18 18 18 18

ABSTRACT: Quenching 30KhGVT steels from an 880C temperature shows a sharp increase in strength with practically no change in plasticity or ductility. The 30KhGVT steels contain chromium-manganese alloys, and chemical analysis of carbide²⁷ precipitates in these steels show that the carbide exists in the form of cementite alloyed in manganese, chromium, and tungsten.¹⁷ The alloyed cementite is found to be very stable and dissolves in austenite at high temperatures. Optimum properties for 30KhGVT steel are observed at 900-920C quench temperature. Aging the steel at the quench temperature, up to 12 hours, increases the strength and ductility but slightly lowers its impact strength.¹⁸ Furthermore, microstructure analysis shows that the fine-grained structure of 30KhGVT steels is retained up

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to 1100C. These data are shown to be of great significance for evaluating regimes of thermal treatment in large-scale steel products. Orig. art. has: 3 tables.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NO REF SOV: 000

OTHER: 000

Cord 2/2

ACCESSION NR: AP4029836

8/0279/64/000/002/0137/0142

AUTHOR: Braun, M. P. (Kiev)

TITLE: The hardenability of complex alloy steels

SOURCE: AN SSSR. Izv. Metallurgiya i gornoye delo, no. 2, 1964, 137-142

TOPIC TAGS: hardenability, complex alloy steel, strength, plasticity, consistency, chromium containing steel, manganese containing steel, silicon containing steel, 25KhGSN steel, 30KhGVT steel, 30Kh2GMT steel, 35KhNM steel, 40KhN steel, nickel containing steel, copper containing steel, molybdenum containing steel, titanium containing steel, tungsten containing steel

ABSTRACT: The calculation of the hardenability of complex alloyed steels by the use of multiplier coefficients has provided overestimated results and cannot be used for practical purposes. The hardenability of complex alloy steel and the nomograms in the article (Blanter, M. F.; Metodika issledovaniya metallov i obrabotki opy*tny*kh danny*kh (method of investigating metals and the treatment of experimental Metallurgizdat, 1962) are not used since underestimated values are obtained. The so-called "semimartensite zone" in many cases is not defined and cannot serve as a reliable criterion. The evaluation of hardenability according to zone depth with a structure

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90% martensite and 10% troostite (i.e., a tempered zone with a hardness not less than 45R_C) is more accurate. Chromium-manganese and chromium-manganese-silicon steels, additionally alloyed with a complex of elements, attain excellent hardenability. Additional alloying with the nickel-copper, molybdenum-titanium, nickel-molybdenum-titanium and tungsten-titanium groups beneficially effects the hardenability of chromium-manganese-silicon steel. The complex alloyed steels 30KhGVT, 30KhG2MT, 30Kh2G2MT have satisfactory hardenability in large cross sections. These steels can be successfully substituted for the nickel containing steel 40KhN, 35KhNM and others. Orig. art. has: 2 tables and 3 figures.

ASSOCIATION: none

SUBMITTED: 038ep63

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: ML

NO REF SOV: 007

OTHER: 000

Card 2/2

L 17869-66		EWT(m)/EPF(n)-2/EWA(d)/EWP(t)		LJP(c)		JD/JG	
ACC NR: AR5027743		SOURCE CODE: UR/0277/65/000/008/0012/0012					
AUTHOR: <u>Braun, M.P.; Lyashenko, L.A.</u>							
ORG: none							
TITLE: Heat resistance and the phase compound of <u>cast</u> complex-alloy austenite steel							
SOURCE: Ref. zh. Mashinostroytel'nyye materialy, konstruksii i raschet detaley mashin. Gidroprivod, Abs. 8.48.69							
REF SOURCE: Sb. Novoye v liteyn. proiz-ve. Kiyev, Tekhnika, 1964, 109-113							
TOPIC TAGS: heat resistance, austenite steel, alloy steel, molybdenum, tungsten, niobium							
TRANSLATION: A study was made of the effect on the heat resistance of Fe-Cr-Ni alloy (type 16-20) by the addition of <u>W, Mo, Nb, and Ti.</u> The heat resistance was evaluated by the centrifugal method and proved to be highest when alloyed with Mo, W, and Nb.							
SUB CODE: 11							
Card 1/19						UDC: 669.14.018	

L 56557-65 EWT(d)/EWT(m)/EWP(k)/EWP(z)/EWP(h)/EWP(b)/T/EWA(d)/EWP(l)/EWP(w)/
EWP(v)/EWP(t) Pf-4 MJW/JD

AC ESSION NR: AP5018809

UR/0304/64/000/005/0049/0050

35
32
8

AUTHOR: Braun, M. P. (Doctor of technical sciences); Kondrashev, A. I. (Engineer);
Vinokur, B. B. (Candidate of technical sciences)

TITLE: Use of complex alloyed steels for large induction hardened products

SOURCE: Mashinostroyeniye, no. 5, 1964, 49-50

TOPIC TAGS: alloy steel, induction hardening, metal hardness, metal fatigue,
metal deformation, annealing, mechanical engineering

Abstract: The Institute of Foundry Problems of the Academy of Sciences
Ukrainian SSR and the Novo-Kramatorsk Machine Building Plant conducted
research on induction hardening of new non-nickel steels (30KhGVT and
30Kh2GT). An installation was mounted on a type DIP-300 lathe. Heating
was conducted at a frequency of 3,000 cps and was regulated by changing the
feed rate of the inductor and by changing the current parameters.

Research established that at 320 amps and 100 kw, with a feed rate of
2.5 meters per minute and sample angular velocity of 52 rpm, a heating temper-
ature of 1,050°C is obtained. At this temperature, the depth of the hardened
layer in 30KhGVT is 6.9 mm with a hardness of 56. In another series of
research, using the very same current parameters, the rate of feed was

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L 56557-65

ACCESSION NR: AP5018809

increased to 3.75 m/min and the angular velocity to 91 rpm. In this case, the heating temperature was 970°C, and the depth of the hardened layer was cut to 4.1 mm. The hardness of the hardened layer was Rc 50.

A further increase in speed of movement of the inductor to 5 m/min and an angular velocity of 112 rpm dropped the temperature to 900°C. Depth of hardness was cut to 3 mm and hardness to Rc 48.

A decrease in power to 80 kw at 350 amperes with all other parameters remaining constant causes a lowering of the temperature of heating and decreased hardness.

Wholly similar results were obtained in studying samples of 30Kh2GMT steel, with the exception that, in all cases, the hardness of this steel was somewhat higher than in 30KhGVT steel.

It should be noted that induction heating of samples of 40KhN chromium nickel steel, regardless of the higher content of carbon, gives the same hardness as in 30Kh2GMT steel. To study the influence of annealing on the hardness of the induction hardened layer, samples of 30KhGVT, 30Kh2GMT, and 40KhN steels were annealed at 200-600°C for 1-15 hours, and at 650°C for 20 minutes to 15 hours. The 15-hour period was selected on the basis of industrial data showing that most products are subjected to a 15-hour annealing period after induction heating.

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L 56557-65

ACCESSION NR: AP5018809

3
It was found that annealing of 30KhGVT steel at 200-250°C does not change the hardness of the hardened layer (Rc 45) even after a 15-hour anneal. Four-hour annealing at 300°C leads to a decrease in hardness by 3 units. When annealing within the range of 350-600°C, the change in hardness in relation to annealing time was approximately the same for all steels. An exception was found only in the degree of softening. Annealing at 650°C leads to very rapid softening -- within 20 minutes, the hardness drops to one-half of its former value, and, within 1.5 hours, it is already equivalent to the hardness of the inside layers.

A determination was made of the thermal fatigue of complex alloyed steels and steels alloyed with nickel. The samples were water quenched after induction heating. In samples of 30KhGVT and 30Kh2GMT steels, no cracks were found even after heating and quenching 10 times. However, for the 40KhN steel sample, cracks were detected right after the second heating quenching. In the case of through heating (in a furnace) and quenching of samples of 30KhGVT and 30Kh2GMT steels, cracks appeared after 14-16 cycles. Samples of 40KhN steel had cracks after the second quench and 35KhNM steel samples had cracks after the fourth quench.

6 A study of the tendency of steels to deform (warp) during induction hardening, made on rods 1,700 mm long and 150 mm in diameter, showed that after

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ACCESSION NR: AP5018809

hardening as per the above-mentioned sequence, rods of non-nickel steels had warped 1.5 mm, and those of 40KhN steel more than 10 mm.

The results of this research showed the possibility of using non-nickel steels for induction-hardened articles.

The experiments proved the feasibility of utilizing complex alloyed 30KhGVT and 30Kh2GT steels for large induction-hardened items.

Orig. art. has 2 tables.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: NM, IE

NO REF SOV: 000

OTHER: 000

JPRS

mb
Card 4/4

BRAUN, M.P. (Kiyev); VESELYANSKIY, Yu.S. (Kiyev)

Electron microscopy of cast steels with respect to alloying
and heat treatment. Izv. AN SSSR. Met. i gor. delo no.6:107-
116 N-D '64. (MIRA 18:3)

BRAUN, M.P.; KOVALENKO, V.S.; ZATS, Ye.L.

Effect of zirconium on kinetics of carbide coalescence in prolonged isothermal heating of carbon steel. Izv. vys. ucheb. zav.; chern. met. 7 no.12:122 '64 (MIRA 18:1)

1. Institut liteynogo proizvodstva AN U.S.S.R i Donetskii nauchno-issledovatel'skiy institut chernoy metallurgii.

VINOKUR, B.B., kand. tekhn. nauk; BRAUN, M.P., doktor tekhn. nauk;
KONDRASHEV, A.I., inzh.

Inefficiency of the use of boron steel for large articles.
Mashinostroenie no.2:65-67 Mr-Apr '65. (MIRA 18:6)

BRAUN, M.P., doktor tekhn. nauk; MIROVSKIY, E.I., inzh.; LEVITANUS, A.D.,
kand. tekhn. nauk; KARAMZIN, E.I., inzh.; SLAVIN, B.A., inzh.

Using low-nickel and nickelless steels for pinions of tractor
transmissions. Mashinostroenie no.2:85-87 Mr-Ap '65.

(MIRA 18:6)

L 63197-65 EWT(m)/EWA(d)/EWP(z)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c)
 ACCESSION NR: AP5018520 MJW/JD/HM UR/5304/65/000/004/0049/0052
 669.115-194:621.882.621.827
 AUTHORS: Popov, N. V. (Engineer); Braun, M. P. (Doctor of technical sciences);
 Vinokur, B. B. (Candidate of technical sciences); Skol, A. N. (Candidate of
 technical sciences); Zaletskiy, G. I. (Candidate of technical sciences)
 TITLE: Optimum composition and thermal treatment for steels for tractor parts
 SOURCE: Mashinostroyeniye, no. 4, 1965, 49-52
 TOPIC TAGS: steel, mechanical property, carbon steel, machine part, stress
 measurement, heat treatment/ 40KhN steel, 30KhGSA steel, 45Kh steel, 45G2 steel
 ABSTRACT: Four kinds of steel (40KhN, 30KhGSA, 45Kh, 45G2) for connecting rod
 bolts and three kinds (45Kh, 45G2, improved 45) for connecting rods were studied.
 Numerical data are presented in text and are tabulated. For bolts the design
 stipulated a HB 288-314 hardness, 109-95 kg/cm² tensile strength, 11.4-8.6 kg/cm²
 impact toughness. These properties can be obtained in 40KhN steel by oil hardening
 and tempering at 500-550C. Similar properties can be obtained in 45Kh, 45G2, and
 30KhGSA with an increased C content. Oil hardening of 18-mm diameter specimens
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ACCESSION NR: AP5018520

resulted in a martensite structure throughout in 40KhN, and a martensite-bainite mixture at the centers of 45Kh and 45G2. The design of the D-54 engine stipulated a 110 kg/mm² tensile strength. Steels with a nickel content performed better than the heat-treated 40KhN. The fatigue limit was 50 kg/mm² for 45G2, 46 kg/mm² for 30KhGSA, and 44 kg/mm² for 40KhN and 45Kh. In view of the pulsating character of the stresses in bolts, a total stress of 42 kg/mm² and an initial stress of 20 kg/mm² are recommended. Fatigue failures in service were investigated. Steel 30KhGSA showed a lower susceptibility to stress concentration. A 4-year survey of four kinds of bolts in actual service indicates that 45Kh and 45G2 are suitable for medium power engines, and 30KhGSA for higher powers. For connecting rods a HB 229-255 hardness was required. This was obtained with tempering at 570-630C. The other requirements were: the tensile strength was 79-88 kg/mm², the yield point of 67-79 kg/mm², elongation per length unit of 16-18%, section contraction of 60-65%, impact toughness of 11-13 kg.mt/cm². After normalization, the improved 45Kh and 45G2 answered these specifications. The connecting rods were tested in special testing machines. The fatigue limit of 45G2 was only 7%, and of 45Kh only 20% lower than that of the improved 45 steel. A 1-year survey of nearly 4000 operating tractors led to the conclusion that 45G2 with a simplified thermal treatment can be successfully and economically used for connecting rods. The same

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I. 63197-65

ACCESSION NR: AP5018520

steel in its improved form possesses even better mechanical properties. Orig. art.
has: 4 tables.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MM, IE

NO REF SOV: 000

OTHER: 000

Bolting, p

mlb
Cord3/3

BRAUN, M.P., doktor tekhn.nauk; VINOKUR, B.B., kand.tekhn.nauk

Fatigue breakdown resistance of steels. Mashinostroenie
no.6:87-88 N-D '65. (MIRA 18:12)

PLETNIK, R.I.; BRAUN, M.P.

Transformation of austenite in alloyed cast iron during continuous cooling. Lit. proizv. no.9:35-36 S '64. (MIRA 18:10)

BRAUN, M.P.; VESELYANSKIY, Yu.S.

Electron microscopy of the structure of steel castings in connection with their complex alloying and phenomena of reversible temper brittleness. Izv. vys. ucheb. zav.; chern. met. 8 no.10:120-128 '65. (MIRA 18:9)

1. Ukrainskaya sel'skokhozyaystvennaya akademiya.

BRAUN, M.F.; NEIZHKO, I.G.

Method of heat treating specimens for the study of phase transformations. Metalloved. i term. obr. met. no.11: 30 N '65. (MIRA 18:12)

1. Institut problem lit'ya AN UkrSSR.

L 63995-65 EWP(e)/EWT(m)/EWP(i)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c)
IJP(c) JD/WH/HJ/JG

AM5019748

BOOK EXPLOITATION

UR/

35

53

46

61

Vinokur, Bertol'd Bentsionovich; ^{55,44}Braun, Mikhail Petrovich; ^{55,44}Matyushenko, Nelli
Ivanova; Tikhonovskaya, Larisa Dmitriyevna

^{55,44}Heat-resistant steel; ^{6,55,44}alloying, ^{53,44}modification, and heat treatment (Zharoprochnaya
stal'; legirovaniye, modifitsirovaniye i goryachaya obrabotka) Kiev, Naukova
dumka, 1965, 265 p. illus., biblio. (At head of title: Akademiya nauk
Ukrainskoy SSR. Institut problema lit'ya) 1800 copies printed.

^{55,44}TOPIC TAGS; steel, heat resistant steel, heat resistant alloy, modification,
deformation, heat treatment, heat resistance

PURPOSE AND COVERAGE: This book is intended for engineering personnel at
scientific research institutes and industrial enterprises, and students con-
cerned with the heat-resistance of materials. The book deals with the aspect
of alloying elements on steel heat resistance and reviews the classification
of heat resistant materials. Problems of microalloying and modifying steel,
and their connection with problems of strength are discussed. The effect of
alloying and modifying additions on the structure and properties of heat-
resistant materials is analyzed. Attention is given to the study of phases and

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structure of heat-resistant modified steel, as related to hot deformation and heat treatment.

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SUB CODE: MM

SUBMITTED: 05Apr65

NO REF SOV: 069

OTHER: 007

llc
Card 3/3

BRAUN, Mikhail Petrovich; GILELAKH, V.I., red.; DIKIY, V.N.,
mlad. red.

[Complex alloy structural steels] Kompleksnolegirovannye
konstruktsionnye stali. Kiev, Naukova dumka, 1965. 291 p.
(MIRA 19:1)

L 0632-66 EWP(m)/EWA(d)/T/EWP(c)/EWP(z)/EWP(b) MJW/JD/DJ

ACC NR: AP5027707 SOURCE CODE: UR/1029/65/000/011/0024/0026

AUTHOR: Braun, M. P.; Sevruk, B. A.; Mirovskiy, E. I.; Samchenko, V. G.; El'kina, T. P. 44.55 44.55 44.55 44.55 44.55

ORG: USKhA; Khar'kov Tractor Plant (Khar'kovskiy traktornyy zavod) 44.55 75 72 B

TITLE: New 20KhGSVT case-hardenable steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 11, 1965, 24-26

TOPIC TAGS: case hardening, steel, transmission gear, tensile strength, carburization, tractor / 20KhGSVT steel

ABSTRACT: The article describes the newly developed 20KhGSVT case-hardenable steel (0.23% C, 1.02% Mn, 0.7% Si, 1.0% Cr, 0.9% W, 0.06% Ti) replacing the high-strength 20KhN3A and 20KhGMR chromium-nickel steels as the material of the main and side transmission gears of the T-74 tractor. 20KhGSVT steel is superior to the 20KhN3A and 20KhGMR steels in its mechanical properties (tensile strength 164 kg/mm² compared with 148 and 140 kg/mm², respectively, for the other two steels). It is more resistant to temper brittleness, owing to the presence of W and Ti. Test-rig studies of main and side transmission gears of the T-74 diesel tractor, made of 20KhGSVT steel, showed that this steel can be used to fabricate important work parts of tractors. The gears of 20KhSVT steel were case-hardened in a solid carburizer. The total time of

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L 9632-66

ACC NR: AP5027707

2
case-hardening and subsequent cooling of both gear wheels was 24 hours. Following their case-hardening the gears were oil-quenched from 860°C and tempered at 220°C. On the basis of the results of laboratory and test-rig studies, 750 T-74 tractors were experimentally equipped with side-transmission gears of 20KhGSVT steel. All these tractors have been in operation for more than two years now, without a single instance of breakdown of a tractor owing to poor performance of the side-transmission gears of 20KhGSVT steel. Orig. art. has: 3 figures, 2 tables.

SUB CODE: 11, 13/ SUM DATE: none/ ORIG REF: 000/ OTH REF: 000

Card

2/2

VESELYANSKIY, Yu.S.; BRAUN, M.P.

Electron microscopy of the structure and fracture of
alloyed steel castings in connection with homogenizing
and subsequent normalizing. Sbor.trud. VNIIM no.11:290-
308 '65. (MIRA 18:11)

ALEKSANDROV, A.G., kand. tekhn. nauk; BRAUN, M.F., doktor tekhn. nauk;
Prinimali uchastiye: GOL'VEK, I.M.; BERKUN, M.N.; KUREENKO, L.M.;
GALKIN, Yu.N.

Cast, nickel-free, heat-resistant alloys. Lit. proizv. no.12:
8-10 D '65. (MIRA 18:12)

L 03769-67 EWT(d)/ENT(m)/I/EWP(t)/ETI IJP(c) JD/DJ

ACC NR: AP6019852 (A, V) SOURCE CODE: UR/0418/66/000/001/0079/0081

AUTHOR: Popov, N. V. (Engineer); Braun, M. P. (Doctor of technical sciences); Sokol, A. N. (Candidate of technical sciences); Zaletskiy, T. I. (Candidate of technical sciences) 47
44
B

ORG: None

TITLE: High-quality steel for tractor transmission gears 17

SOURCE: Tekhnologiya i organizatsiya proizvodstva

TOPIC TAGS: nickel steel, tempering, transmission gear, contact stress, tensile strength

ABSTRACT: The authors discuss the development of a series of grades of steel containing small amounts of nickel and therefore less expensive than chrome-nickel steel. The new grades have been used and tested at the Department of Metal Technology of USKhA and the Central Plant Laboratory of the Volgograd Tractor Plant. This Plant Laboratory has proposed a new grade of steel* (251 KhGSNT) with the following composition (in %): C 0.20-0.26, Mn 1.0-1.3, Si 0.8-1.0, Cr 1.1-1.4, Ni 0.9-1.2, Ti 0.05-0.10, P less than 0.04 and S less than 0.05. The mechanical properties of this new steel were compared with those of 20KhNZA high-nickel steel after normalization by pseudocarbonization, quenching and low-temperature tempering. This comparison showed that the mechanical

Card 1/2 * 20XH3A

** 25XGCHT

UDC: 669.15:621.833

L 03769-67

ACC NR: AP6019852

3

properties of the new grade of steel are superior to those of 20KhNZA. Additional tests were carried out to determine the applicability of the new grade of steel in making parts, and in particular its ability to withstand heavy loads such as those which occur in tractor transmissions. The sensitivity of this steel to concentrated stresses was studied by bending circular specimens with annular cuts. Analysis of the results shows that 25KhGSNT steel is less sensitive to concentrated stresses than 20KhNZA steel. The contact strength of the steel was also tested on a three-roller machine made by the Institute of Mechanics of the Academy of Sciences UkrSSR. Stresses at the point of contact during testing were 200-450 kg/mm² with a test base of 10⁷ cycles. The tensile strength of the new steel is 300 kg/mm² while that of 20KhNZA is 250 kg/mm². Products made from 25KhGSNT steel require moderate cooling after normalization. This steel has been used by the Volgograd Tractor Plant for several series of gears in the transmissions of the DT-54A and DT-75 tractor engines. Tests of these gears under operating conditions show satisfactory results. The new grade of steel gives a savings of 20-25 kg of nickel per ton of steel, an economy of more than 2 kg of nickel per transmission. Orig. art. has: 3 tables.

SUB CODE: 11, 13/ SUBM DATE: none

Card 2/2

tdh

L 29380-66 EWT(m)/EWP(t)/ETI IJP(c) JD	
ACC NR: AP6019795	SOURCE CODE: UR/0286/65/000/004/0032/0032
INVENTOR: <u>Braun, M. P.</u> ; <u>Mirovsky, E. I.</u> ; <u>Sevruk, B. A.</u> ; <u>Samchenko, V. G.</u> ; <u>El'kina, T. P.</u>	
ORG: none	
TITLE: Non-nickel structural steel, Class 18, No 168321	
SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 4, 1965, 32	
TOPIC TAGS: structural steel, metal property	
ABSTRACT: A non-nickel structural steel with increased physical and mechanical properties is proposed which contains: 0.18-0.24% C, 0.8-1.0% Si, 0.8-1.2% Mn, 0.04% (max) P, 0.04% (max) S, 0.8-1.2% Cr, 0.04-0.06% Ti, and 0.6-0.8% W. Orig. art. has: 1 table. [JPRS]	
SUB CODE: 11 / SUBM DATE: none	
Card 1/1 CC	UDC: 669.14.018.29

L 25832-66 EWT(m)/EWP(w)/ENA(d)/T/EWP(t)/EWP(k) IJP(c) JD/HW
ACC NR: AP6012322 SOURCE CODE: UR/0304/65/000/006/0087/0088

AUTHORS: Braun, M. P. (Doctor of technical sciences); Vinokur, B. B. (Candidate of technical sciences) 44
34
B

ORG: none

TITLE: Resistance of steels to fatigue failure

SOURCE: Mashinostroyeniye, no. 6, 1965, 87-88 18

TOPIC TAGS: steel, material strength, fatigue limit, fatigue strength, material testing, metal test

ABSTRACT: A study was made of the resistance of steels to fatigue failure. It is noted that fatigue failure is not accompanied by noticeable plastic deformation. However, microscopic analysis always shows shear lines. The plastic deformed zone changes the character of the stress distribution along a section of the specimen. This leads to variation of the value of the moment of internal forces equalizing these stresses. The errors and misconceptions associated with the use of conventional fatigue computations based upon the flow limits are discussed. An experimental determination of the fatigue limit is recommended, particularly for high-strength steel alloys. A comparison of the fatigue strength of eight steel alloys is given, showing the comparative values of strength as computed by five formulas and the

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UDC: 539.431.669.15 2

L 25832-66

ACC NR: AP6012322

fatigue limits found by laboratory testing. The steels compared are 40KhN, 35KhM, 35KhNM, 34KhN3M, 30KhGVT, 30Kh2GMT, 35KhGNV, and 35KhGN2V, which were tested on a Shenka testing machine. Two additional steels, 5KhGSNT and 20KhN3A were similarly compared after fatigue testing on an NU machine. Orig. art. has: 5 equations and 2 tables.

SUB CODE: 11/

SUBM DATE: none

Cord

2/2

L 36058-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/JH

ACC NR: AP6014343

SOURCE CODE: UR/0128/65/000/012/0008/0010

AUTHOR: Aleksandrov, A. G. (Candidate of technical sciences); Braun, M. P. (Doctor of technical sciences)

ORG: none

TITLE: Nickel-free cast high-temperature alloys ¹⁴

SOURCE: Liteynoya proizvodstvo, no 12, 1965, pp 8-10

TOPIC TAGS: austenitic steel, ferritic steel, chromium steel, manganese steel, high temperature strength, impact strength

ABSTRACT: Austenitic Cr-Ni steels and alloys are used as the material for various equipment operating at high temperatures, since they display a good combination of high-temperature strength and toughness. They are, however, expensive owing to their high Ni content, and hence Ni-free alloys of this kind have been developed in the last few years. But the applicability of Ni-free alloys is limited by their low impact strength in cast state. Most of these alloys belong in the ferritic or austenitic-ferritic class and are melted in basic electric furnaces. Considering that many industrial enterprises operate acid furnaces, it was of interest to determine whether these furnaces could be used to melt Ni-free high-temperature alloys

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UDC: 621.74.011;669.018.44

L 36058-66

ACC NR: AP6014343

6

additionally treated with other elements. Accordingly, the authors experimentally investigated the possibility of achieving a high impact strength in specimens of cast ferritic and austenitic-ferritic Cr,²Cr-Al,³Cr-Mn-Ti⁴ and Cr-Mn-Si-Al steels melted in induction and acid furnaces taking as the criterion a minimum impact strength of 1.5 kg-m/cm². On this basis it is established that ferritic high-temperature Cr steels, owing to, among other things, the growth of their grain and increase in their brittleness in the course of their operation, are unsuitable for the fabrication of castings and so the attention should be confined to the development of austenitic steels, which display a sufficiently high impact strength in cast state. Accordingly, further experiments were confined to austenitic steels, melted in acid-lined electric furnaces and containing 0.35-50% C and up to 14.5-15% Cr and Mn, which were additionally treated with Si (up to 2.0%) and Al (up to 1.3%), and it was found that their impact strength exceeded the minimum, reaching as high as 6.1 kg-m/cm². In austenitic alloys of this kind the effect of the ferrite-forming elements Cr, Si, Al is apparently suppressed by the combined effect of Mn and C. Alloys of this kind may be used in cast state for high-temperature purposes without prior heat treatment (hardening). Orig. art. has: 4 figures, 3 tables.

SUB CODE: 13, 11/ SUBM DATE: none/ ORIG REF: 005

Card 2/2 vmb

L 37942-66 EWT(m)/EWP(w)/I/EWP(t)/ETI IJP(c) JD/JG
 ACC NR: AP6023447 (A) SOURCE CODE: UR/0369/66/002/003/0333/0335
 AUTHOR: Braun, M. P.; Skok, Yu. Ya. 39
 ORG: Institute of Casting, AN UkrSSR, Kiev (Institut lit'ya AN UkrSSR) 12
 TITLE: The effect of rare-earth metals and calcium-silicon on the ductility of structural steel
 SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 2, no. 3, 1966, 333-335
 TOPIC TAGS: steel, structural steel, rare earth metal, ~~metal containing steel~~, steel property, steel structure
 ABSTRACT: A study was made of the effect of microalloying with rare-earth metals (Mishmetal, FTSM-5, lanthanum and yttrium) and calcium-silicon on the mechanical properties, the fracture behavior, and the structure of as-cast 30KHGVT structural steel. The additives were introduced in the furnace after complete deoxidation with ferrosilicon and aluminum 2-3 minutes before tapping. The results showed that microalloying did not affect the strength but greatly increased the characteristics of ductility. With additives at optimum contents the impact toughness increased by a factor of 2, i. e. it attained the same level as that of forged steel. The beneficial effect of the additives increased in the following order: calcium-silicon, FTSM-5, Mishmetal, lanthanum, and yttrium. The addition of rare-earth metals refined the macrostructure and changed the fracture from coarse-dendritic to fine-
 Card 1/2

L 37942-66

ACC NR: AP6023447

grained. However, larger than optimum rare-earth-metal contents brings about a coarsening of the macrostructure and makes the fracture brittle. Orig. art. has: 1 figure and 1 table.

[FM]

SUB CODE: 11, 13/ SUBM DATE: 07May65/ ORIG REF: 006/ OTH REF: 001/ ATD PRESS:

5048

Card 2/2mLP

L 02370-67 EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG
ACC NR: AP6032197 SOURCE CODE: UR/0418/66/000/005/0081/0082
AUTHOR: Braun, M. P. (Doctor of technical sciences); Tikhonovskaya, L. D. (Engineer);
Khil'chevskaya, T. V. (Engineer)
ORG: none
TITLE: Investigation of the modifying effect of lithium on cast austenitic steel
SOURCE: Tekhnologiya i organizatsiya proizvodstva, no. 5, 1966, 81-82
TOPIC TAGS: GRAIN SIZE, LITHIUM,
austenitic steel, cast ~~austenitic~~ steel, lithium containing alloy, metal
property/EI695 steel
AUSTENITIC
ABSTRACT: An attempt has been made to introduce lithium as a modifier into molten
EI695 austenitic steel heated to 40 and 140C above liquidus. Melting was done in an
induction furnace of 2 kg capacity. It was found that even a slight addition of
lithium decreases the grain size of steel. For instance, the grain size of steel
with 0.97% of lithium added at 120C above liquidus was 21 microns as compared with
57 microns for steel without lithium. While lithium decreases grain size, it also
increases the contamination of steel and in turn has a negative effect on its prop-
erties. This can be avoided, however, by limiting the lithium content (best results
obtained at 0.34%). Orig. art. has: 3 tables. [TD]
SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 001/
Card 1/1 vmb UDC: 669.141.24:669.884

000000-67 EWP(m)/EWP(w)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6029651

(A)

SOURCE CODE: UR/0182/66/000/008/0038/0040

AUTHOR: Braun, M. P.; Mar'yushkin, L. G.; Akulinin, M. A.

42
39

ORG: none

TITLE: Effect of heating temperature on the plasticity, structure and mechanical properties of high-chromium Kh17N2 steel

SOURCE: Kuznechno-shtampovochnoye proizvodstvo, no. 8, 1966, 38-40

TOPIC TAGS: high chromium steel, metal forging, plasticity, mechanical property, high temperature effect / Kh17N2 high-chromium steel

ABSTRACT: This mark of steel (~0.15% C, ~0.24% Si, ~0.52% Mn, ~16.43% Cr, ~1.78% Ni, ~0.023% P, ~0.016% Si) is widely used in the fabrication of work parts performing in a humid environment at temperatures of up to 300-400°C. Its high corrosion resistance is combined with satisfactory mechanical properties. Since it proved impossible to produce satisfactory production of forgings from large ingots of this steel at temperatures of 1150-800°C, the authors explored the possibilities for improving their quality by investigating the plasticity of this steel at elevated temperatures and the attendant change in structure and mechanical properties.

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UDC: 621.78.01.7

L 08982-67
ACC NR: AP6029654

1

Plasticity was studied by upsetting cylindrical specimens of this steel at temperatures of 1270 to 780°C, once through every 50°C, on chromium-plating their surfaces to avoid scaling. The findings were used to plot the plasticity curve of Kh17N2 steel (Fig. 1), which proved to be of a

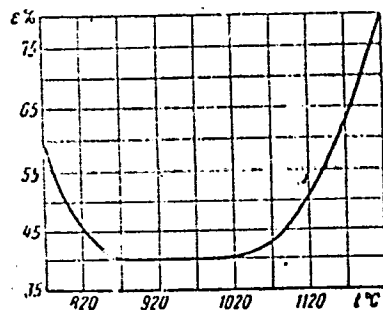


Fig. 1. Plasticity diagram of forged Kh17N2 steel

parabolic character, decreasing at from 870 to 1020°C and increasing at higher or lower temperatures. The critical degree of deformation ϵ at 780°C is 60%; at 870-1020°C, 40%; and at 1220°C, 50%. As the temperature is further increased to 1250-1270°C, ϵ becomes virtually absent. Accordingly, the specimens forged at 1250°C displayed satisfactory plasticity. This

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ACC NR: AP6029651

2

was followed by investigation of mechanical properties of the forgings. It was found that ingots forged at 1270°C displayed a higher malleability than those forged at 1150°C; the plasticity of the metal was quite satisfactory, whereas the ingot forged at 1150°C displayed a large number of cracks. Furthermore, the ingots forged at the higher temperature (1270°C) displayed higher yield point and relative elongation. On the other hand, their tensile strength and impact strength were the same as those of the ingots forged at the lower temperature. Examination of the microstructure of the upset specimens showed that in every case it consists of δ -ferrite and martensite or products of its decomposition, with the amount of δ -ferrite increasing with temperature, (75-80% at 1270°C against 25-30% at 800-850°C). It was further established that the structure of ingots of Kh17N2 steel containing more than 50% δ -ferrite after forging can be corrected by means of an appropriate heat treatment, namely, by quenching in oil from 1000°C and tempering at 600°C for 5 hr; the resulting microstructure is that of fine-disperse sorbite containing only 5-10% δ -ferrite, so that the danger of excessive plasticity of the metal is averted. Orig. art. has: 6 figures, 1 table.

SUB CODE: 13, 11/ SUBM DATE: none

Card 3/3 nst

ACC NR: AM6015330

Monograph

U.S.

AUTHOR: Braun, Mikhail Petrovich

Complex alloy structural steels (Kompleksnolegirovannyye konstruktsionnyye stali)
Kiev, Naukova dumka, 1965. 291 p. illus., biblio. (At head of title: Akademiya
nauk Ukrainskoy SSR. Institut problem lit'ya) 2200 copies printed.

TOPIC TAGS: steel, alloy steel, steel alloying, carbon containing steel, chromium
containing steel, nickel containing steel, silicon containing steel, steel
brittleness, tempering induced brittleness, brittle failure elimination

PURPOSE AND COVERAGE: This book is intended for engineering personnel of scientific
research institutes and industrial organizations specializing in steel alloying.
It may also be useful to aspirants and students of schools of higher education.
The book reviews theoretical principles and results of experimental investigations
in the field of steel complex alloying. Considerable attention is paid to the
analysis of the mechanical and technological properties of chromium-manganese,
chromium-manganese-nickel, silicon-manganese, and chromium-silicon-manganese steels,
whose characteristics depend upon conditions of heat treatment and other factors.
The causes of brittle failure are discussed and suggestions as to how to eliminate
them by additional alloying are made. Data on the use of complex alloy steels in
industry are presented.

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SUB CODE: 11, 20/ SUBM DATE: 12Aug65/ ORIG REF: 241/ OTH REF: 062/

Card 3/3

ACC NR: AT6036281

(N)

SOURCE CODE: UR/0000/66/000/000/0136/0143

AUTHOR: Lyashenko, L. A.; Braun, M. P.

ORG: Institute for casting problems AN Ukr-SSR (Institut problem lit'ya AN Ukr-SSR)

TITLE: Investigation of the effect of alloying on the structure and properties of cast austenitic steel

SOURCE: AN Ukr-SSR. Struktura metallicheskih splavov (Structure of metal alloys). Kiev, Izd-vo Naukova dumka, 1966, 136-143

TOPIC TAGS: iron base alloy, stainless steel, cast steel, austenitic steel, refractory metal

ABSTRACT: The authors investigated the effect of alloying and heat treatment on the refractory properties, strength, structure, and phase composition of cast refractory steels which are known to suffer from several defects (chemical nonuniformity, coarse grain, porosity, and blow holes). Steels with the base Cr 15 Ni20 were alloyed with about 2% Co, 4% Mo, 4% W, and 0.1% Ti, quenched at 1150°C in water and annealed at 850°C for 10 hours. Specimens of these alloys were analysed metallographically and by x ray diffraction. Chemical separation of phases before and after annealing, and before and after the creep test, showed considerable changes in the amounts of alloying elements in solid solution. Alloying with tungsten and molybdenum increases

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ACC NR: AT6036281

creep strength. Addition of Mo and W also leads to the formation of an intermetallic compound of the AB_2 type. Orig. art. has: 4 figures and 3 tables.

SUB CODE: 11/ SUBM DATE: 18May65/ ORIG REF: 002

ACC NR: AP7000593

(A)

SOURCE CODE: UR/0129/66/000/011/0021/0022

AUTHOR: Braun, M. P.; Krukovskaya, G. N.

ORG: Institute of Casting Problems (Institut problem lit'ya)

TITLE: Temper brittleness of cast steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 11, 1966, 21-22

TOPIC TAGS: cast steel, steel tempering, ~~steel temper~~ brittleness, temper brittleness prevention/25KhGSL steel

ABSTRACT: The effect of cooling conditions after tempering on the temper brittleness of 25KhGSL cast steel has been studied. Steel specimens of various heats (0.28 to 0.30% C, 1.04—1.14% Cr, 0.91%—1.16% Mn, and 1.03—1.24% Si) were annealed at 910C, tempered at 660C, and cooled in air, in a furnace at a rate of 180C or 10C per hour, or were cooled in potassium nitrate heated to 380C and then in a furnace at a rate of 180C per hour. It was found that, depending steel composition, the room-temperature notch toughness of specimens cooled in water is 3.6—5.5 kgm/cm², and of those cooled in stages is 3.3—5.1 kgm/cm². The NDT temperature gradually decreases with an increase in cooling rate: -35C in specimens cooled in water and -15C in specimens cooled in stages. Alloying 25KhGSL steel with 0.4% and 0.7% W increases the notch toughness by 20—25% and decreases the NDT temperature to -65 to -70C. The complete prevention of reversible temper brittleness in cast chromansil-type

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UDC: 669.14.018.000

ACC NR: AP7000593

steel susceptible to reversible temper brittleness can be achieved only by combining additional alloying with cooling in stages. Orig. art. has: 1 figure and 2 tables.

SUB CODE://, 13/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 002/

Card 2/2

RYABKO, Khariton Grigor'yevich; BRAUN, Mark Naumovich; CHERNAY, Oleg Aleksandrovich; PIVOVAROV, Konstantin Stepanovich; SOLYANIK, Yu.P., inzh., red.; ONISHCHENKO, N.P., inzh., red.

[Small machine-tool units; manufacture and operation] Malye agregatnye stanki; proizvodstvo i ekspluatatsiia. Moskva, Gos. nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1960. 169 p. (MIRA 13:5)

(Machine tools)

BRAUN, O.V.

Improving the braking device of PS-1200 self-unloading centrifugals.
Sakh. prom. 31 no.5:32-33 My '57. (MLRA 10:6)

1. Sakharneyy zavod imeni Il'icha.
(Centrifuges) (Sugar industry--Equipment and supplies)

BRAUN, O.V.

Study of the behavior of sugars during processing. Sakh.prom.
32 no.10:26-29 0 '58. (MIRA 11:11)
(Sugar beets) (Sugar--Analysis and testing)

BRAUN, O.V. (Kiyev)

Effect of prolonged storage on the composition of sugar in beets.
Agrobiologia no.5:774-775 S-0 '60. (MIRA 13:10)
(Sugar beets--Storage)

BRAUN, O.V.

Some particular aspects of the chemical and technical accounting of
sugar in the processing of beets from long-period storage. Sakh.
prom. 35 no.2:30-34 F '61. (MIRA 14:3)
(Sugar beets) (Sugar industry—Accounting)

BRAUN, O.V.

Crystallization of sucrose from solutions in the presence of
raffinose. Izv.vys.ucheb.zav.; pishch.tekh. no.1:107-108
'64. (MIRA 17:4)

1. Kiyevskiy institut narodnogo khozyaystva, kafedra tekhnicheskikh
i tekhnologicheskikh distsiplin.

BRAUN, O.V.

Preparation of flux for silver solder in a plant laboratory.
Sakh.prom. 30 no.8:39-40 Ag. '56. (MLRA 9:11)

1. Yagotinskiy sakharnyy zavod imeni Il'icha.
(Solder and soldering) (Steam turbines--Maintenance and repair)

116

The hemorrhagic diathesis and fibrinopenia in bone marrow carcinoma. E. Braun and M. Horányi (Univ. Budapest). *Folia Hæmatol.* 71: 784-9 (1951).—Two cases of hemorrhagic diathesis were studied which were caused by fibrinopenia resulting from bone marrow carcinoma. Serum fibrinolysins appeared temporarily. John T. Myers

BRAUN, P.

SZABO, G.;BRAUN, P.;KALDOR, A.

Competition among the substances excreted by the liver or kidneys.
Magy. belorv. arch. 5 no.2:62-66 June 1952. (CML 25:5)

1. Doctors. 2. First Internal Clinic (Director -- Prof. Dr. Istvan
Rusznayak), Budapest Medical University.

BRAUN, P.

Mechanism of the effect of antibiotics; theoretical problems and their practical applications. Orv. hetil. 93 no. 32:924-927 10 Aug 1952.
(GLML 23:5)

1. Doctor. 2. First Internal Clinic (Director -- Prof. Dr. Istvan Rusznyak), Budapest Medical University.

BREIT
SZÁBO, G.; BRAUN, P.; KALDOR, A.

Competition between substances excreted by the liver and the kidney.
Acta med. hung. 4 no.3-4:229-240 1953. (CML 25:5)

1. Of the First Department of Medicine of Budapest University.

BRAUN, PAL

Hungary/Analytical Chemistry - Analysis of Organic Substances, G-3

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61906

Author: Kisfaludy, Sandor; Braun, Pal

Institution: None

Title: Quantitative Determination of Amino Acids by Means of Paper Chromatography

Original

Periodical: Aminosavak kvantitativ papirkromatografias meghatarozasa, Magyar tud. akad. biol. es orvosi tud. oszt. kozl., 1954, 5, No 1, 77-87; Hungarian; Z. ges. innere Med., 1954, 9, No 14, 699-701; German

Abstract: Amino acids are separated by 2-dimensional chromatography on filter paper Whatman No 1, 36 x 36 cm. Solvent in first direction, mixture of phenol and distilled water (free from Cu^{2+}) (3:1), in the second direction mixture of n-propyl alcohol (I) and distilled water (7:3). Dried at room temperature, moistened with dilute solution of ninhydrin (II) (to solution of 10 mg $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ in 10 ml acetate buffer, 500 ml 1 N NaOH + 500 ml 2 N CH_3COOH , added 25 mg II brought

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Hungary/Analytical Chemistry - Analysis of Organic Substances, G-3

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61906

Abstract: up to 100 ml with I), developed ~10 minutes at 65°, spots outlined and amino acids identified by Rf values. Paper moistened with solution of 1 g KOH in 100 ml alcohol free from aldehydes, hold 15 minutes at 65°, cut out outlined areas of paper, place them in graduated test tubes, add 4 ml of ninhydrin reagent (to solution of 60 mg $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ in 50 ml acetate buffer of pH 4.7 added 0.75 g II and 50 ml glycol, dissolved with heating, solution stable for 24 hours), placed for 20 minutes in boiling water, then for 3 minutes in ice, bring up to 10 ml with mixture of acetone and distilled water (7:3), after 15 minutes make photometric determination (S57 filter, in case of proline and oxyproline S44 filter, comparison with distilled water), result of photometric measurement of blank sample is subtracted and amount of amino acid is determined from calibration curve. Values of ϵ are given for various amino acids: alanine 0.160, arginine 0.126, asparagine 0.137, aspartic acid 0.150, cystine 0.086, phenylalanine 0.155, glutamic acid 0.154, glycine 0.149, histidine 0.118, leucine 0.147, lysine 0.146, methionine 0.146, proline 0.050, oxyproline 0.040, serine 0.150, threonine 0.137, tryptophane 0.130, tyrosine 0.153, valine 0.153.

Card 2/3

Hungary/Analytical Chemistry - Analysis of Organic Substances, G-3

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 61906

Abstract: The method makes it possible to determine amino acids in the presence of serum after removal of proteins and salts from the latter. Average error of the method is $\pm 10\%$, it is higher in the case of cystine, proline and oxyproline.

Card 3/3

BRAUN, Pal, dr.; KISFALUDY, Sandor, dr.; DUBSIY, Maria, dr.

Examination of free amino acids in normal and pathological serum and in urine by means of quantitative paperchromatography. Orv. hetil. 95 no.25-26:682-688 24 June 54.

1. A Budapesti Orvostudományi Egyetem I. sz. Belklinika-jának (Igazgató: Ruzsnyak István dr. akadémikus) közleménye.

(AMINO ACIDS, determination chromatography in normal & pathol. serum & urin)

(BLOOD

amino acids, chromatography)

(URINE

amino acids, chromatography)

BRAUN, P. dr.

Louis Pasteur. Ther. hung. no.2:25-27 1955.

(BIOGRAPHIES
Pasteur, Louis)

BRAUN, P.

HUNG.

Quantitative analysis of free amino acids in normal and pathological human serum and urine. P. Braun, S. Kisfalksy, and M. Dubsky (Univ. Med. School, Budapest). *Acta Med. Acad. Sci. Hung.* 7, 147-59 (1955).—A paper chromatographic method of analysis of human serum and urine amino acids consists of a qual. sepn. by the ascending method using 4:1 phenol-Cu free distd. H₂O for the first dimension and a 7:3 propanol-Cu free distd. H₂O for the second dimension. Cu impurities are removed from the paper by adding 8-hydroxyquinoline or KCN to the solvents. Spots are developed by 0.2% alc. ninhydrin soln. For data, the penciled spots are sprayed with 1% alc. KOH, kept at 65° 15 min., the spots cut out, transferred to a 7:3 mixt. of acetone-H₂O in calibrated tubes and the optical d. detd. spectrophotometrically. Free amino-acid contents of normal serum in γ/ml. were alanine, 37; arginine, 12; aspartic acid, 5; cystine, 23; glutamine, 40; glutamic acid, 16; glycine, 19; histidine, 21; leucine, 23; lysine, 16; phenylalanine, 17; proline, 16; serine, 8; threonine, 6; tyrosine, 11; valine, 22. No significant deviation from normal amino-acid content was observed in severe hepatitis or cirrhosis of the liver. In the urine of one uremic patient there was marked increase in the phenol-contg. amino acids, phenylalanine and tyrosine. R. Berueffy

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BRAUN, P.

BRAUN, P.; FOLDI, M.; KISFALUDY, S.; SZABO, GY.

Free amino acid content of the lymphs. Acta med. hung. 10 no.1-2:
67-73 1956.

1. I. medizinische Universitätsklinik und pathophysiologische
Abteilung des Forschungs-Instituts für experimentelle Medizin
der ungarischen Akademie der Wissenschaften, Budapest.

(LYMPH

free amino acid content in dogs (Ger))

(AMINO ACIDS, determ.

in lymph, free amino acid content in dogs (Ger))

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me 260. Free amino acid content of the lymph. P. Draun, M. Foldi,
S. Kisfaludy, and G. Szabo *Nature, Lond.*, 1938, 177, 1133-1134
(1st Dept. of Med., Univ. of Budapest, Komnyi Sándor u.2/a,
Budapest, VIII, Hungary). I. B. PARR

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BRAUN, Paul, dr.

Medicinal therapy; development of Hungarian chemico-pharmaceutic industry. Suvrem. med., Sofia 8 no.2:3-11 1957.

1. Redaktor na sp. Terapiia ungarika--Budapeshoha.
(DRUG INDUSTRY,
in Hungary (Bul))

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KISFAUDY, Sandor; HRAUN, Pal

Amino acid studies in Wilson disease. Magy. belorv. arch. 10 no.5-6:
144-148 Oct-Dec 57.

1. A Budapesti Orvostudományi Egyetem I. Belklinikájának közleménye
(igazgató: Ruzsnyak István).

(HEPATOLENTIGULAR DEGENERATION, metab.

Wilson's dis., amino acid content of blood & urine (Hun))

(AMINO ACIDS, determ.

in blood & urine in Wilson's dis.(Hun))

BRAUN, Pal; FOLDI, Mihaly; KISFALUDY, Sandor; SZABO, Gyoggy

Amino acid determination in lymph. Kiserletes orvostud. 10 no.1:11-14
Feb 58.

1. Budapesti Orvostudományi Egyetem I. Belklinika.
(LYMPH
amino acid content in dogs (Hun))
(AMINO ACIDS, determ.
in lymph in dogs (Hun))

BRAUN, Pal, Dr.

The dark side of modern pharmacotherapy. Orv. hetil. 99 no.24:818-822
15 June 58.

1. A Budapesti Orvostudományi Egyetem I. sz. Belklinika-jának (igazgató:
Rusznayk Istvan dr. egyet. tanár) közleménye.
(DRUGS, inj. eff.
(Hun))

BRAUM, Pal, Dr.; HORVATH, Istvan, Dr.

Amylase and transaminase activities in the serum of healthy and sick persons. Orv. hetil. 99 no.35:1210-1214 31 Aug 58.

1. A Budapesti Orvostudományi Egyetem, I. sz. Belklinikájának (igazgató: Rusznyak István dr. egyet. tanár) közleménye.

(AMYLASES, in blood

determ. in healthy persons & various dis. (Hun))

(TRANSAMINASES, in blood

glutemic oxalacetic & glutamic pyruvic transaminases,
determ. in healthy persons & various dis. (Hun))

BRAUN, Pal, Dr.; PAPP, Miklos, Dr.; HORVATH, Istvan, Dr.

Experimental examination of the transaminase activity of the serum and lymph. Orv. hetil. 99 no.49:1703-1704 7 Dec 58.

1. A Budapesti Orvostudományi Egyetem I. sz. Belklinika-jának (igazgató: Ruzsnyák István dr. egyet. tanár) közleménye.

(TRANSAMINASES, determ.

glutamic - oxalacetic & glutamic - pyruvic transaminases in blood & lymph in dogs, eff. of liver lesions (Hun))

(LYMPH

glutamic - oxalacetic & glutamic - pyruvic transaminase activity in dogs, eff. of liver lesions (Hun))

(LIVER, physiol.

eff. of liver lesions on glutamic - oxalacetic & glutamic - pyruvic transaminase activities in blood & lymph in dogs (Hun))

TARASOV-AGALAKOV N.; VOZYAKOV, V.; GOLUBEV, S.; LAVROV, D.; ANANOV, I.;
GELAKH, V.; BOLANIN, H.; KASHCHENKO, V.; MAKAROV, M.; GOLOSTIN, M.;
ZNAMENSKIY, N.; DZHALALOV, Ye.; GLEBOV, V.; CHELYSHEV, F.;
D'YAKOV, N.; ~~BRAUN, P.~~

Georgii Innokent'evich Zhukov; obituary. Posh.delo 5 no.7:32
Jy '59. (MIRA 12:9)
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BRAUN, P., dr.

Diseases due to enzymatic dysfunction. Ther.hung. 7:23-26
'59.

1. First Department of Medicine (Director: Prof.I.Rusznayk),
Medical University of Budapest.
(ENZYMES)

FOLDI, Mihaly; BRAUN, Pal; PAPP, Miklos; STECZEK, Katalin

Experimental study on serum transaminase activity in myocardial lesions caused by lymphedema. Orv. hetil. 100 no.16:578 19 Apr 59.

1. A Budapesti Orvostudományi Egyetem I. Belklinikájának (igazgató: Rusznyak István dr. egyet. tanár) és a Kísérletes Orvostudományi Kutató Intézet közleménye.

(HEART, pathol.

exper. myocardial lesions induced by lymphedema causing increased blood glutamic-oxalacetic transaminase activity in dogs (Hun))

(LYMPHEDEMA, exper.

causing myocardial lesions in dogs followed by increased blood glutamic-oxalacetic transaminase activity (Hun))

(TRANSAMINASES, in blood

glutamic-oxalacetic transaminase, increased activity in myocardial lesions induced by lymphedema in dogs (Hun))

BRAUN, Pal, Dr.

Enzymes. Orv. hetil. 100 no.20:713-717 17 May 59.

1. A Budapesti Orvostudományi Egyetem I. Belklinika-jának (igazgató:
Rusznayk István dr. egyet. tanár) közleménye.

(ENZYMES
(Hun))

BRAUN, Pal, dr.; NEMETH, Eva P., dr.; PAPP, Miklos, dr.; STECZEK, Katalin

Determination of leucine aminopeptidase activity in the sera
of healthy and sick persons; preliminary report. Orv.hetil.
100 no.39:1414-1415 S '59.

1. A Budapesti Orvostudományi Egyetem I. Belklinikájának
(igazgató: Ruzsnyák István dr. egyetemi tanár) és III.
Sebészeti Klinikájának (igazgató: Rubanyi Pál dr. egyetemi
tanár) közleménye.

(NEOPLASMS blood)

(PROTEASES blood)

BRAUN, P.

Collagen, collagen system diseases. Orv.hetil. 101 no.3:101
Ja '60.

(COLLAGEN DISEASES)

BRAUN, P.

Psychotherapy in internal diseases. Orv.hetil. 101 no.7:
249-250 F '60.

(PSYCHOTHERAPY)